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Whence

$$\int_q^p f(x)dx = (p-q)f\left[\frac{p+q}{2}\right] + \frac{1}{12}(p-q)^3.$$

[W. H. Echols.]

Also solved by Messrs. Geo. R. Dean, Eric Doolittle, and H. Y. Benedict.

### EXERCISES.

369

SOLVE the equation

$$\frac{d^2y}{dx^2} - y = e^{\frac{1}{2}x^2}.$$

[Geo. R. Dean.]

370

FROM a point  $A$  on the equator a northeast rhumb line is drawn ; find at what latitude it again strikes the meridian of  $A$ , and express the length of the rhumb line in radii.

[James McMahon.]

371

PROVE that the ratio of

$$\left| \begin{array}{ccc} \sigma_1(2u_1), & \sigma_1(2u_2), & \sigma_1(2u_3) \\ \sigma_2(2u_1), & \sigma_2(2u_2), & \sigma_2(2u_3) \\ \sigma_3(2u_1), & \sigma_3(2u_2), & \sigma_3(2u_3) \end{array} \right|$$

to

$$\sigma(u_2 + u_3) \sigma(u_3 + u_1) \sigma(u_1 + u_2) \sigma(u_2 - u_3) \sigma(u_3 - u_1) \sigma(u_1 - u_2)$$

is independent of the arguments  $u_\lambda$  ; and that its value is

$$4(e_2 - e_3)(e_3 - e_1)(e_1 - e_2);$$

the notation being that of Weierstrass.

[Frank Morley.]

372

WHEN the bilinear invariant of two binary  $n$ -ics is zero, we say that the  $n$ -ics are *apolar*. When also the  $n$ -ics coincide we say that either is self-apolar. And we may apply the same adjectives to the sets of  $n$  points (or  $n$ -ads) which represent the zeros of the  $n$ -ics. Any odd set of points is, we know, self-apolar (Salmon's Higher Algebra, § 153). Prove that an even set is self-apolar when the first polar of any point of the set, with regard to the rest, is self-apolar.

[Frank Morley.]